

# Microgravity Cell Counter: A Simple Hand-held Low-cost Device for In-flight WBC/Differential

Completed Technology Project (2011 - 2012)



## Project Introduction

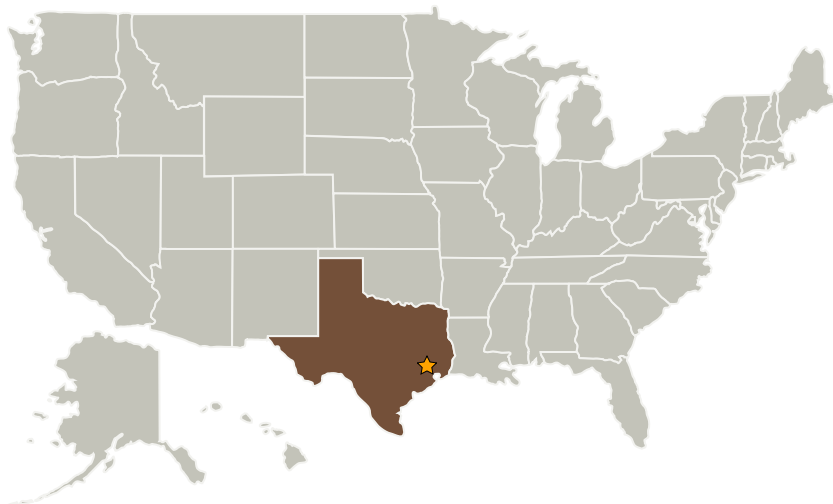
The ability to monitor hematology parameters during spaceflight is currently an unmet medical requirement (NASA-STD-3001). This project evaluated a DNA stain/CCD camera based technology to provide a White Blood Cell count + differential (granulocytes, lymphocytes, monocytes, eosinophils, basophils) analysis during microgravity conditions.

Spaceflight results in adverse health effects on the human body. These effects may result in increased clinical risk to crewmembers participating in exploration-class deep-space missions. For clinical monitoring of astronauts and for in-flight biomedical research, laboratory instruments must be designed which function in the spaceflight environment. Currently there is no instrument capable of generating a white blood cell (WBC) count and differential during spaceflight, even though this is an existing National Aeronautics and Space Administration (NASA) medical requirement. We evaluated a new commercial analyzer in the context of spaceflight requirements and compatibility with the zero gravity environment. Reduced gravity analysis was performed during terrestrial parabolic flight. The analyzer was found to uniquely meet the basic requirements for spaceflight and should be appropriate for measuring WBC parameters onboard the International Space Station.

## Anticipated Benefits

We anticipate the technology may have use onboard ISS for both medical diagnosis or research studies.

## Primary U.S. Work Locations and Key Partners



This miniaturized instrument, manufactured by Hemocue, performs a white blood cell count and differential analysis. Following evaluation, it was found to be microgravity compatible and an excellent candidate for use onboard the International Space Station. On right, a fingerstick blood collection into the reagent cuvette.

## Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3

# Microgravity Cell Counter: A Simple Hand-held Low-cost Device for In-flight WBC/Differential

Completed Technology Project (2011 - 2012)



Organizations Performing Work	Role	Type	Location
★ Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas

## Primary U.S. Work Locations

Texas

## Images



12381-1378820598642.jpg

Project Image Microgravity Cell Counter: A Simple Hand-held Low-cost Device for In-flight WBC/Differential  
(<https://techport.nasa.gov/image/2298>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Johnson Space Center (JSC)

### Responsible Program:

Center Innovation Fund: JSC CIF

## Project Management

### Program Director:

Michael R Lapointe

### Program Manager:

Carlos H Westhelle

### Project Manager:

Brian E Crucian

### Principal Investigator:

Brian E Crucian

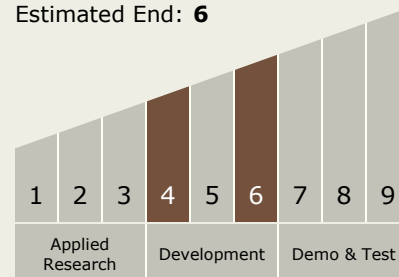
# Microgravity Cell Counter: A Simple Hand-held Low-cost Device for In-flight WBC/Differential

Completed Technology Project (2011 - 2012)



## Technology Maturity (TRL)

Start: **4**  
Estimated End: **6**



## Technology Areas

### Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - └ TX06.3 Human Health and Performance
    - └ TX06.3.2 Prevention and Countermeasures